10-02-00   A

PATENT APPLICATION TRANSMITTAL LETTER (Large Entity)	Docket No. 99EC036-77527

<u>TO THE ASSISTANT COMMISSIONER FOR PATENTS</u>

Transmitted herewith for filing under 35 U.S.C. 111 and 37 C.F.R. 1.53 is the patent application of:

James, et al.

For:

System and Method of Using a Phone to Access Information in a Call Center

Enclosed are:

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☒ **Spec 18 pgs ---5**   sheets of drawings.

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Applicant(s): James, et al.	99EC036-077527

Serial No.	Filing Date **Herewith**	Examiner	Group Art Unit

Invention:

SYSTEM AND METHOD OF USING A PHONE TO ACCESS INFORMATION IN A CALL CENTER

I hereby certify that the following correspondence:

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SYSTEM AND METHOD OF USING A PHONE TO ACCESS INFORMATION IN A CALL CENTER

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Field of the Invention

This invention relates to communications systems and, more particularly, to administration of call centers using voice access.

10

Background of the Invention

Call centers are typically used as a means of distributing customer contacts such as facsimiles, e-mails, video, internet voice, telephone calls, etc. among a group of call center agents of an organization. As customer contacts are directed to the organization from the public switched telephone network (PSTN) or other communication networks, an automatic call distributor (ACD) directs the customer contacts to its call center agents based upon some algorithm. For example, the ACD may recognize a telephone call target based upon an identity of an incoming trunk line and route the call accordingly.

Call center administrators manage and ensure the proper performance of the call center. To manage the call center efficiently, it is important for the call center administrator to have access to the call center wherever the administrator is. For example, if the administrator is called away to another building, it is important for the administrator to be able to check the performance, configuration and attributes of the call center while the administrator is away. Further, administrators who must travel are often away from the call center that they manage and

thus require access to the call center to determine whether the call center is properly functioning.

Currently, an administrator who is away from the call center has two options: 1) call a person who is in charge and ask that person for a status of the call center or 2) dial in to the call center by using a portable computer and checking the status of the call center.

The first solution requires that the administrator depend upon another person to get required information. This solution may not be optimal if the person answering the telephone call is not well skilled or trustworthy. The second solution is also not optimal, as it requires the companies that use call centers to purchase a portable computer and modem for every administrator in the company. In a large company with many call centers, this solution requires many portable computers. Further, the administrator must be able to locate a telephone line for which the administrator may be able to dial up to connect to the call center. Finding a telephone line to which the administrator may connect the portable computer may be difficult if the administrator is in a location that does not have such access, such as travelling in a car. Further, this solution requires the company to install the appropriate number of dial up lines so that administrators are not disconnected or put on hold because the dial up lines are unavailable. Both solutions are less than optimal. As a consequence, the performance of the call center may degrade or be impaired when an administrator is away.

Accordingly, a need exists for a better way of
allowing the call center administrator to access the
call center when the administrator is physically
remote from the call center.

5

Summary

The present invention, accordingly, provides a
system and method of using a phone to provide call
center administrators access to information in a call
10   center that overcomes or reduces the disadvantageous
and limitations associated with prior methods and
systems. Illustrated embodiments reduce the
disadvantage of not having access to a call center
when physically distant from the call center.

15

Brief Description of the Drawings

The foregoing advantageous features of the
invention will be explained in greater detail and
others will be made apparent from the detailed
20   description of the preferred embodiment of the
present invention which is given with reference to
the several figures of the drawing, in which:

FIG. 1 illustrates a simplified functional block
diagram of a call center in accordance with an
25   illustrated embodiment of the invention.

FIG. 2 illustrates a simplified functional block
diagram of an alternative embodiment of a call center
in accordance with an illustrated embodiment of the
invention.

30   FIG. 3 illustrates a simplified functional block
diagram of an exemplary embodiment of a call center
in accordance with an illustrated embodiment of the
invention.

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FIG. 4 illustrates a simplified functional block diagram of a voice response server of a call center.

FIG. 5 is a simplified flow diagram of the method used by the system of FIG. 4.

5

Detailed Description

Shown in Fig. 1 is a call center 100 shown in a context of use. The call center 100 includes a number of agents 12, administrators (14, 16), an automatic

10 call distributor 9, a call center command server (3CS) 8, and a voice response server 30. The call center 100 functions to selectively and automatically interconnect customer contacts such as a caller 20 calling through the public switched telephone network

15 (PSTN) 10 to one of the agents 12 in the call center 100. Although the call center 100 is described with reference to an automatic call distributor (ACD), a PBX or centrex system may also be used in place of the ACD. Further, implementing a call center with any

20 of these switching systems is considered to be equivalent and variations will not be discussed further. For a more detailed discussion of automatic call distributors, reference may be made to U.S. Pat. No. 5,268,903 to Jones et al. entitled "Multichannel

25 Telephonic Switching Network With Different Signaling Formats and Connect/PBX Treatment Selectable For Each Channel", issued December 7, 1993; U.S. Pat. No. 5,140,611 to Jones et al. entitled "Pulse Modulated Self-Clocking and Self-Synchronizing Data

30 Transmission and Method for a Telephonic Communication Switching System", issued Aug. 8, 1992 and U.S. Pat. No. 5,127,004 to Lenihan et al. entitled "Tone and Announcement Message Code

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Generator for a Telephonic Switching System and
Method", issued Jun. 30, 1992 which are hereby
incorporated by reference.

5   Further, although the present invention is
described in reference to the PSTN 10, a packet-
switched voice network or other equivalent network
where customer contacts are relayed to a call center
100 may be used. For example, where voice calls are
transmitted over a global network, such as the
10   Internet using Internet Protocol (IP) a packet-
switched communications network may be used to
implement the system of transmitting the call.

      In addition to the agents 12, the call center
also includes administrators 14, 16. Local
15   administrators 14 are people who are responsible for
the management of the call center and are physically
at the call center 100. Remote administrators are
also responsible for the management of the call
center 100 but are not physically at the call center
20   100. The administrators' 14, 16 responsibilities
include, for example, configuring and monitoring call
center entities, viewing call center statistics,
editing telephony files, and activating call center
schedules. In an exemplary embodiment, the call
25   center information that is managed by administrators
14, 16 is summarized in the following table.

Staff	Automatic Number Identification	Message Display Unit Real-Time Display
Agent Schedule	Trunk Group	Display Message Command
Schedule Adherence Threshold Groups	Route Class	Activate Announcement Command
Night/Day Service/Center Open/Close	Route	Delayed or Scheduled Change Activation
Override Application Vector	Route List/Route List Entry	Retrieve Directory Numbers
Agent Group	Network Number	Custom Timing Profile
Agent Information Group	Announcement	Digital Signal Processing Type
Class of Service	Receiver Group	Digital Audio Service Type
Speed Code	Function Type	
Transaction Code	Intercept (Class) Table	Equipment
Application	Call by Call Service Table	Serial Data Port
Application Detailed Schedule	Permanent & NSC Port Table/Device/T0/T0T/ Trunk Group Member	T1
Message Queue	Automatic Call Handlers – VRU, Fax, and Voice Mail Objects	Devices T0/T0T/TGM Configuration
Security User		Retrieve Events
System/System Model/Header	Telescripts and Telescript Versions	Copy Memory
Dialed Number Identification Service	Application Overflow Statistics	Voice Mail
	Alarm	

The call center 100 includes a voice response server 30 that functions to provide access to the call center information summarized above. The voice response server 30 accepts an administrator's input such as character, audio and speech and retrieves the information from the call center. As shown in the example of FIG. 4, the voice response server 30 includes a call manager 32, VXML interpreter 36, and network interface 38.

The call manager 32 functions to interface with either a local or remote administrator 14, 16. The call manager 32 accepts character, audio, and speech

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input from the administrators 14, 16 to perform call connection services and process speech. Further, the call manager performs text to speech translation and automatic speech recognition processing. The call

5 manager 32 accepts character input that includes dual-tone multi-frequency (DTMF) and speech information. In response to a administrator's input, the voice response server 30 outputs call center 100 information to the administrator (14 or 16). The

10 output from the voice response server 30 to an administrator 14, 16 may also be character, audio and speech, such as synthesized speech and digitized audio. The call manager 32 may perform text to speech translation to aurally output information to

15 administrators 14, 16. For example, an administrator (14 or 16) may speak a request to hear the call log. The call manager 32 accepts the speech command and performs speech recognition on the speech input to translate the request into a command to be executed

20 in the call center computers. Once the call log information is retrieved from the call center, the call manager 32 performs text to speech translation to aurally give the call log information to the administrator.

25   In an illustrative embodiment, the call manager 32 includes speech recognition software such as IBM's ViaVoice. Speech recognition software is used to perform translation of the input speech so that the voice response server may understand the requested

30 command. Any alternative speech recognition software suitable for recognizing the speech of administrators 14, 16 may also be used. The call manager also includes speech synthesis software to perform

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translation of text into speech. Any suitable speech
recognition software may be used to perform this
function.

In the exemplary embodiment in FIG. 4, the VXML
5   interpreter 36 functions to translate information
between an administrator (14 or 16) and the ACD 9 or
3CS server 8. Specifically, the VXML interpreter 36
interfaces to the call manager 32 and network
interface 38 to translate information between an
10   administrator 14, 16 and the computers in the call
center, such as ACD 9 or 3CS server 8. After input
processing is performed by the call manager 32, the
input command is processed by the VXML interpreter 36
into an ACD or 3CS server command to be executed in
15   the call center. The VXML interpreter 36 implements
Voice eXtensible Markup Language (VoiceXML), a
specification developed by an industry organization
which is a standard for providing Internet services
via voice interfaces, such as the telephone. In the
20   above example, the VXML interpreter 36 receives a
VoiceXML command to hear the call log and translates
the VoiceXML command into to a command which is
executed to retrieve the call log from the 3CS server
8.

25   The network interface 38 functions to manage the
transmission and receipt of data between the voice
response server 30 and the ACD 9 and 3CS server 8.
The network interface 38 receives commands to be
executed on the ACD 9 or 3CS server 8 and translates
30   the commands into data packets. Further, network
interface 38 receives data packets from ACD 9 or 3CS
server 8 and translates the data packet into
information for the VXML interpreter 36. If the

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voice response server 30 is connected to the ACD 9 by
an Ethernet connection, then the network interface 38
functions to manage Ethernet data packets.
Alternatively, the connection may be any equivalent
5   local area network, wide area network, Intranet,
Internet, or extranet connection.

In an exemplary embodiment, a Windows NT 4.0
server utilizing dual Pentium processors with minimum
clock speeds of 200 MHz with 128 MB of RAM may be
10   regarded as the type of voice response server 30
contemplated herein. Equivalent processors and
equivalent operating systems may also be used.
Further, the voice response server 30 includes analog
voice ports to support wireless or wireline telephony
15   connections. For example, remote administrator 16
may connect to the voice server 30 by communications
devices including a telephone, cell phone, personal
digital assistant and laptop computer.

In an exemplary embodiment, the call center 100
20   includes 3CS computer 8 that functions to provide the
voice response server 30 with information from the
ACD 9. The 3CS computer 8 provides access to
configuration, real time and call control information
for the agents, agent groups, call center
25   applications, and ACD 9 objects. For example, the
3CS computer 8 may relay statistics and performance
information to the voice response server 30. The 3CS
computer 8 also provides administrative features
including viewing equipment configurations,
30   reconfiguring equipment attributes, and editing
software applications.

In an exemplary embodiment, the functionality
provided by the voice response server 30 is separate

from the 3CS computer 8. However, the functionality may be combined into one computer system as shown in FIG. 2. Further, although the call center described includes one ACD and one 3CS computer 8, the call

5   center may include a plurality of ACDs and a plurality of 3CS computers. For example, a company that requires a number of agents will typically utilize four or five ACDs and 3CS computers in one call center as shown in FIG. 3.

10   In accordance with an embodiment of the present invention, a method of using a telephone to access information in a call center is provided which includes the steps of: (a) connecting to a voice response server (Block 32), (b) processing telephone

15   requests (Block 34), and (c) responding to telephone requests (Block 36).

The step of connecting (Block 32) functions to interface with either a local or remote administrator 14, 16. The connection process includes verifying

20   that authorized administrators 14, 16 are accessing the call center 100. Checking login names with associated password information may perform verification. If an authorized administrator 14, 16 does not provide an appropriate password, then access

25   will be denied. In an illustrative embodiment of the invention, authentication of administrators 14, 16 may be performed within the voice response server 30.

The step of connecting (Block 32) also includes provide a telephony interface to administrators 14,

30   16. The telephony interface may accept character, audio, and speech input from administrators 14, 16 to perform connection services and process input received. Further, the step of connecting (Block 32)

10

may also perform text to speech translation and automatic speech recognition processing. The step of connecting further includes the step of accepting character input such as DTML and speech information.

5   The step of processing (Block 34) functions to translate administrator's 14, 16 input to a requested command and execute the command in the computers in the call center. For example, an administrator 14, 16 may speak a request to hear the number of call

10   center agents. The step of processing (Block 34) accepts the speech command and performs speech recognition on the speech input to translate the request into a command to be executed in the call center computers.

15   The step of responding (Block 36) functions to give administrators 14, 16 the results of the processing step (Block 34). The step of responding further includes the step of performing text to speech translation to aurally present information to

20   administrators 14, 16. In the example above, the step of responding (Block 36) aurally presents the number of call center agents in the call center to the administrator 14, 16.

In an illustrative embodiment, the method of

25   FIG. 5 adheres to the VoiceXML standard. The results from the step of connecting (Block 32) and results to the step of responding (Block 36) adhere to the VoiceXML standard.

An embodiment of the present invention may

30   employ learning as a method of increasing efficiency in retrieving call center information. The method recognizes and learns overtime a pattern of regularly used access commands. For example, the user

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regularly accesses the call log. Thus, when the user
logs into the call center, the method may
automatically present call log information to the
user. The ability to predict familiarity and
5   unfamiliarity allows an embodiment of the present
invention to be more useful.

Another embodiment of the present invention may
allow an experienced user to retrieve information
quickly. An experienced user may "barge in" to
10 retrieve information from the call center. Barge in
means to interrupt the presentation of requesting
information during the connection process to retrieve
call center information quickly. For example, the
voice response server may present a welcome message,
15 such as "Welcome to call center #5467 in Wooddale,
Illinois." Before the voice response server finishes
presenting the welcome message, the administrator 14,
16 may barge in with a request for message queue
information.

20 A specific embodiment of a system and method of
using voice to access information in a call center
according to the present invention has been described
for the purpose of illustrating the manner in which
the invention is made and used. It should be
25 understood that the implementation of other
variations and modifications of the invention and its
various aspects will be apparent to one skilled in
the art, and that the invention is not limited by the
specific embodiments described. Therefore, it is
30 contemplated to cover the present invention, any and
all modifications, variations, or equivalents that

fall within the true spirit and scope of the basic underlying principles disclosed and claimed herein.

1.   A method of using voice to access call center information in a call center comprising the steps of:

connecting to a voice response server;

5   processing telephone requests for call center information; and

responding to the telephone requests.

10   2.   The method of claim 1 wherein the step of connecting further comprises the step of interfacing with a telephony server to receive telephony input from a remote administrator.

15   3.   The method of claim 1 wherein the step of connecting to a voice response server further comprises the step of authenticating users of the voice response server.

20   4.   The method of claim 3 wherein the step of authenticating is performed by matching login names with passwords.

5.   The method of claim 1 wherein the step of
25   processing further comprises translating an administrator's input into a command recognized by a computer in the call center.

6.   The method of claim 5 wherein the computer
30   includes an automatic call distributor and call center command server.

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7. The method of claim 1 wherein the step of
processing adheres to the VoiceXML standard.
processing further comprises the step of using speech
recognition to translate an administrator's input
into a command recognized by a computer in the call
center.

8. The method of claim 1 wherein the step of
responding further comprises the step of performing
text to speech translation to aurally present
information to administrators.

9. The method of claim 1 wherein the step of
processing adheres to VoiceXML.

10. The method of claim 1 wherein the step of
processing employs learning to provide a response to
the telephone requests.

11. The method of claim 1 wherein the step of
processing is interrupted by a barge in request.

12. A system for using voice to access call center
information in a call center comprising:
    means for connecting to a voice response server,
    means for processing telephone requests for call
    center information, and
    means for responding to the telephone requests.

13. The system of claim 12 wherein the means for
connecting includes a programmable computer
configured to accept telephony requests.

15

14.   The system of claim 12 wherein the means for processing includes a voice response server comprising a programmable computer.

5   15.   The system of claim 12 wherein the means for responding includes a programmable computer.

16.   A system for using voice to access call center information in a call center comprising:

10   a call manager which provides call center information,
          a VXML interpreter, and
          a network interface.

15   17.   The system of claim 16 wherein the call manager is a programmable computer which interfaces to a telephony server to receive telephone input from a remote administrator.

20   18.   The system of claim 17 wherein the call manager further comprises a telephony interface for receiving telephony input from a remote administrator.

19.   The system of claim 17 wherein the call manager
25   includes a database for authenticating users of the system.

20.   The system of claim 17 wherein the call manager includes a translator for performing speech to text
30   conversion.

16

21. The system of claim 17 wherein the VoiceXML interpreter includes a programmable computer for translating telephony requests to VoiceXML commands.

5   22. The system of claim 17 wherein the VoiceXML interpreter includes a translator for rendering VoiceXML commands into automatic call distributor commands.

10   23. The system of claim 17 wherein the VoiceXML interpreter includes a translator for rendering VoiceXML commands into call center command server commands.

15   24. The system of claim 17 wherein the network interface includes local area network, Internet, extranet, and wireless network software.

25. The system of claim 17 wherein the network
20   interface includes a programmable computer for translating VoiceXML commands into data packets for a local area network.

26. The system of claim 17 wherein the network
25   interface includes computer hardware which retrieves data from a local area network and translates the data into VoiceXML commands.

Abstract

A system and method of using voice to access
information in a call center is disclosed. Providing
5   a voice response server to handle requests from local
and remote administrators allows a call center to be
managed even when administrators are physically
distant from the call center. The voice response
server may adhere to VoiceXML to process requests for
10 call center information from administrators.

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FIG. 1

Caller 20

PSTN 10

Remote Administrator 14

30 — Voice Response Server

ACD 9

Server 8

Agents 12

Local Administrators 16

100

FIG. 2

100

Agents 12

Local Administrators 16

ACD 9

3CS Server 8

Voice 30 Response System

FIG. 3

Remote Administrator 14

PSTN

The VXML Application server is connected to the network.

Inbound administrator calls routed directly to the VXML Application over the network.

Windows NT 4.0
IIS 4.0
VXML VRU/IVR Application

Inbound administrator calls routed through the ACD to the VXML Application

ACD n

ACD 2

ACD 1

3CS Server n

3CS Server 2

3CS Server 1

Lan/Wan/Intranet/Internet/ Extranet

Remote Administrator 14

3CS Real-Time data is collected from the ACD and transmitted over the network to the VXML Application.

FIG. 4

Voice Response Server

Character

Audio

Speech

Call Manager
32

VXML Interpreter
36

Network Interface
38

30

ACD

Internet

32

Connect to Voice
Response Server

34

Process
Telephone
Requests

36

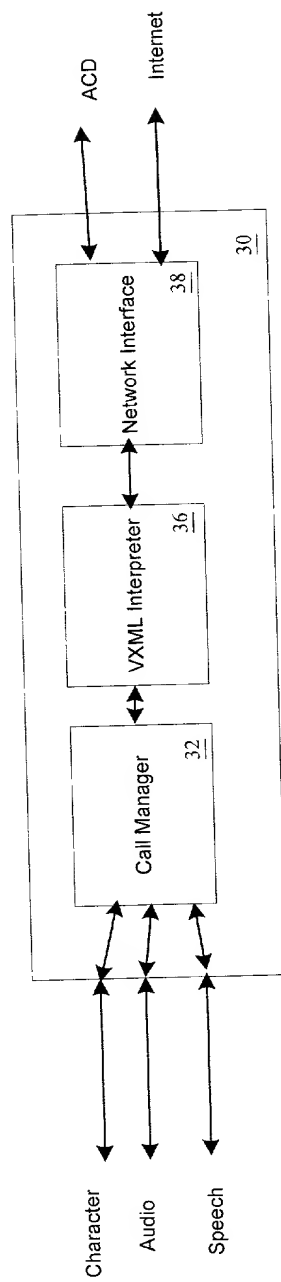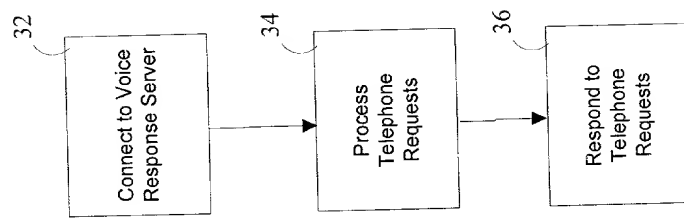Respond to
Telephone
Requests

FIG. 5

DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare:

That my residence, post office address and citizenship are as stated below next to my name.

That I verily believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural inventors are named below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

SYSTEM AND METHOD OF USING A PHONE TO ACCESS INFORMATION IN A CALL CENTER

That I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

That I acknowledge the duty to disclose information to be material to patentability of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

That I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate on this invention having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)   None

I hereby claim the benefit under 35 U.S.C. § 119(e) of any United States provisional application(s) listed below.

_____   _____
(Application Number)   (Filing Date)

_____   _____
(Application Number)   (Filing Date)

That I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

United States Application(s)

_____   _____   _____
(Application Serial No.)   (Filing Date)   (Status)-(Patented, pending, abandoned)

_____   _____   _____
(Application Serial No.)   (Filing Date)   (Status)-(Patented, pending, abandoned)

That all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

I hereby appoint the following attorneys, with full power of substitution and revocation, to prosecute this application and to transact all business in the United States Patent and Trademark Office connected therewith and request that all correspondence and telephone calls in respect to this application be directed to WELSH & KATZ,

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Keith L. Stephens	32,632
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Full name of sole or one joint inventor: David Funck

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